

An Assessment of the Seychelles Scale *Icerya seychellarum* (Westwood) as a Potential Insect of Economic Importance in South Africa

Authors: J.H. Giliomee, and I.M. Millar

Source: African Entomology, 27(1) : 258-260

Published By: Entomological Society of Southern Africa

URL: <https://doi.org/10.4001/003.027.0258>


BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

An assessment of the Seychelles scale *Icerya seychellarum* (Westwood) as a potential insect of economic importance in South Africa

J.H. Giliomee^{1*} & I.M. Millar² 

¹Centre for Invasion Biology, Department of Botany and Zoology, University of Stellenbosch, Private Bag XI, Matieland, 7602 South Africa

²Biosystematics Division, ARC-Plant Health and Protection, Private Bag X134, Queenswood, Pretoria, 0121 South Africa

Our attention was drawn to the scale insect *Icerya seychellarum* (Westwood) (Hemiptera: Monophlebidae), when a severe infestation was observed on a dwarf *Nandina domestica* (Berberidaceae) shrub in a garden in Stellenbosch, South Africa. This discovery represents a new host and locality record for the species.

Icerya seychellarum was described by Westwood (1855) from the Seychelles. It was first recorded from South Africa by Cockerell (1902) who received specimens collected from rose and *Ficus* in what is now the province KwaZulu-Natal. Cockerell (1902) considered it to be a native of South Africa rather than Mauritius or the Seychelles, but Brain & Kelly (1917) listed it as an introduced species. In 1914, it was found on palms in Durban (Brain 1915). Subsequently it has been collected intermittently in South Africa from various localities and hosts. The South African National Collection of Insects, Pretoria, houses specimens from Letsitele on litchi, Komatipoort on litchi and mango, Pretoria on *Hedera helix* and *Vitis vinifera*, Pietermaritzburg on blue gum, Isipingo on *Citrus* sp. and Boane in Mozambique on banana. Munro & Fouché (1936) also listed *Acalypha* spp., *Asparagus* spp., *Ficus carica*, *Michelia champaca*, palm and *Rosa* spp. as hosts.

Modern descriptions and illustrations of the first instar nymph and adult of *I. seychellarum* are provided by Unruh & Gullan (2008). The adult female *I. seychellarum* may be easily recognised by the appearance of the white, mealy wax covering, which is arranged in about 26 distinctive tufts around the margin, an inner concentric row of approximately the same number, and a median longitudinal row of about five tufts (Fig. 1). The waxy tufts are tinged with yellow and there is also a fringe of long, fine wax threads around the body margin. Slides of the specimens collected are deposited in the South African National

Collection of Insects in Pretoria as accession number HC 7328.

Bedford (1965) investigated a heavy infestation of *I. seychellarum* on the Australian chestnut tree, *Castanospermum australe*, in the centre of Pietermaritzburg, South Africa, in 1959. It appeared that that the infestation had been severe since 1948 and that, although the insect was also abundant on several ornamental plants in gardens nearby, it was scarce in other parts of the city. He unsuccessfully tried to introduce the endoparasitic fly, *Cryptochetum monophlebi* Skuse (Diptera: Cryptochetidae), from Mauritius.

Icerya seychellarum has a wide distribution, with the electronic database ScaleNet listing 48 countries (García Morales *et al.* 2016). In Africa, it occurs mainly in countries along the East Coast opposite the Seychelles, such as South Africa, Malawi, Kenya, Uganda and Egypt. It is also present in many countries of the eastern hemisphere such as Pakistan, India, Sri Lanka, China, Japan, Indonesia and Australia. In Europe, it has been recorded in France, but only in Colombia, South America, in the Neotropics.

The species is highly polyphagous, with ScaleNet listing 126 genera from 57 families as hosts (García Morales *et al.* 2016). The list includes many woody plants of economic importance such as litchi, coffee, citrus, grapevine, mango, fig and avocado, but *I. seychellarum* is seldom reported as causing serious damage. In South Africa, *I. seychellarum* is found on litchi (Grové *et al.* 2014) and mango (Grové *et al.* 2017), but it is not considered to be of economic importance on the former, and it is not mentioned in a recent book on insects of cultivated plants in southern Africa (Prinsloo & Uys 2015). However, Moutia & Mamet (1946) considered it as a major pest of orchard and ornamental plants in Mauritius despite the presence of coccinellid predators and in certain areas of Egypt



*Author for correspondence. E-mail: jhg@sun.ac.za

Received 3 October 2018. Accepted 14 November 2018

ISSN 1021-3589 [Print]; 2224-8854 [Online]
DOI: <https://doi.org/10.4001/003.027.0258>

African Entomology 27(1): 258–260 (2019)
©Entomological Society of Southern Africa



Fig. 1. Adult female of *Icerya seychellarum* on dwarf *Nandina domestica* (Berberidaceae).

it has become economically important on mango (Salem *et al.* 2006), apple (Mangoud 2008) and grape vines (Mangoud 2010). It has also been reported as a pest of guava and citrus in Fiji (Lever 1946) and killing citrus trees in Vanautu, an island in the South Pacific Ocean (Williams & Butcher 1987). As a phloem-feeding, honeydew-secreting insect occurring on valuable crops, *I. seychellarum* therefore has the potential of being of considerable economic importance. Newberry (1980) found that the species can significantly reduce plant growth.

The reason why *I. seychellarum* presently does not feature in crop protection strategies in South Africa is probably because it is under good biological control, like its relative *I. purchasi* (Maskell). The predatory coccinellid beetles *Rodolia cardinalis* (Mulsant) and *R. iceryae* Jenson were both found associated with *I. seychellarum* at Pietermaritzburg by Bedford (1965), although not effecting good biological control. In Egypt, Mangoud (2008, 2010) reported good biological control with releases of *R. cardinalis* on apple and grape vines, stating that this ladybird is very fast growing and can complete four generations in the time that *I. seychellarum* takes to complete one generation; when *R. cardinalis* is released into an orchard, it can control *I. seychellarum* within two months (Mangoud 2008). In addition to *Rodolia* spp., ScaleNet lists several species of hymenopteran parasitoids in the

families Aphelinidae, Encyrtidae, Eulophidae and Pteromalidae as parasitoids of *I. seychellarum* as well as the dipteroid *Cryptochetum iceryae* (García Morales *et al.* 2016).

In cases where biological control is not effective, the lack of control may be due to the presence of ants. Ants are commonly known to interfere with the parasitoids and predators of hemipteran insects from which they gather the excreted honeydew as a food source. This was the case in the biological control of the soft scale *Pulvinaria urbicola* Cockerell on Cousine Island in the Seychelles (Gaigher *et al.* 2013) where it was found that high populations of the scale on the tree *Pisonia grandis* collapsed when the ant *Pheidole megacephala* (Fabricius) was controlled. Significantly, this also happened to the populations of *I. seychellarum* which co-inhabited the trees with *P. urbicola* (Gaigher, pers. comm.).

We conclude that *I. seychellarum* has the potential to be of economic importance on several crop plants in South Africa and elsewhere, but appears to be under good biological control in most cases. Where biological control is not effective, the presence and selective removal (e.g. by baits or sticky barriers) of associated ants from scale insect populations should be investigated.

***ORCID iD**

I.M. Millar:  orcid.org/0000-0003-1956-9398

REFERENCES

- BEDFORD, E.C.G. 1965. An attempt to control the Seychelles scale, *Icerya seychellarum* (Homoptera: Coccidae), in South Africa by introducing *Cryptochaetum monophebi* Skuse (Diptera: Cryptochaetidae). *Journal of the Entomological Society of Southern Africa* **28**: 155–163.
- BRAIN, C.K. 1915. The Coccidae of South Africa. *Transactions of the Royal Society of South Africa* **5**: 65–194.
- BRAIN, C.K. & KELLY, A.E. 1917. The status of introduced coccids in South Africa in 1917. *Bulletin of Entomological Research* **8**: 181–185.
- COCKERELL, T.D.A. 1902. *Icerya seychellarum* in S. Africa. *Entomologist's Monthly Magazine* **38**: 86.
- GAIGHER, R., SAMWAYS, M.J. & VAN NOORT, S. 2013. Saving a tropical ecosystem from a destructive ant-scale (*Pheidole megacephala*, *Pulvinaria urbi-cola*) mutualism with support from a diverse natural enemy assemblage. *Biological Invasions* **15**: 2115–2125.
- GARCÍA MORALES, M., DENNO, B.D., MILLER, D.R., MILLER, G.L., BEN-DOV, Y. & HARDY, N.B. 2016. ScaleNet: A literature-based model of scale insect biology and systematics. Database. DOI: 10.1093/database/bav118 <http://scalenet.info>
- GROVÉ, T. & DE BEER, M.S. 2017. Insect pests affecting the production of mango in South Africa. *Acta Horticulturae* **1183**: 297–304.
- GROVÉ, T., SCHOEMAN, P.S. & DE BEER, M.S. 2014. Arthropod pests of litchi in South Africa. *Acta Horticulturae* **1029**: 409–416.
- LEVER, R.J.A.W. 1946. Insect pests in Fiji. *Bulletin of Department of Agriculture, Fiji*. **16**: 41–44.
- MANGOUD, A.A.H. 2008. Evaluation of sequence programs to control *Icerya seychellarum* infesting apple in Egypt. *Proceedings of the XI International Symposium on Scale Insect Studies*, Oeiras, Portugal. ISA Press, Lisbon, Portugal. 322 pp.
- MANGOUD, A.A.H. 2010. The efficiency of the vedalia beetle, *Rodolia cardinalis* (Mulsant) (Coleoptera: Coccinellidae) in suppressing populations of *Icerya seychellarum* (Westwood) (Homoptera: Monophlebidae) on grape vines in Egypt. *Proceedings of the XII International Symposium on Scale Insect Studies*. Chania, Greece. p. 63.
- MOUTIA, L.A. & MAMET, R. 1946. A review of twenty-five years of economic entomology in the island of Mauritius. *Bulletin of Entomological Research* **36**: 439–472.
- MUNRO, H.K. & FOUCHÉ, F.A. 1936. A list of scale insects and mealy bugs (Coccidae) and their host-plants in South Africa. *Bulletin of Department of Agriculture and Forestry, Union of South Africa, Pretoria* **158**: 1–104.
- NEWBERRY, D.M. 1880. Interactions between the coccid, *Icerya seychellarum* (Westw.), and its host tree species on Aldabra Atoll. I. *Euphorbia pyrifolia* Lam. *Oecologia* **46**: 171–179.
- PRINSLOO, G.L. & UYS, V.M. 2015. *Insects of Cultivated Plants and Natural Pastures in Southern Africa*. Entomological Society of Southern Africa, Pretoria, South Africa.
- SALEM, M.S., EL-SAID, M.I., ABD EL-GHANY, A.M. & ABD EL-RAHMAN, M.M. 2006. Susceptibility of five mango cultivars to *Icerya seychellarum* (Westwood) (Homoptera: Margarodidae) in relation to leaf quality nutrients and inhibitors. *Egyptian Journal of Agricultural Research* **84**: 697–702.
- UNRUH, C.M. & GULLAN, P.J. 2008. Molecular data reveal convergent reproductive strategies in iceryine scale insects (Hemiptera: Coccoidea: Monophlebidae), allowing the re-interpretation of morphology and a revised generic classification. *Systematic Entomology* **33**: 8–50.
- WESTWOOD, J.O. 1855. The Seychelles *Dorthisia*. *Gardeners' Chronicle and Agricultural Gazette* **51**: 836.
- WILLIAMS, D.J. & BUTCHER, C.F. 1987. Scale insects (Hemiptera: Coccoidea) of Vanuatu. *New Zealand Entomologist* **9**: 88–99.